

NOTES ON EAST AFRICAN EPHEMEROPTERA,
WITH DESCRIPTIONS OF NEW SPECIES

BY

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NOTES ON EAST AFRICAN EPHEMEROPTERA, WITH DESCRIPTIONS OF NEW SPECIES

By D. E. KIMMINS

THIS paper is based upon material collected by Drs. P. S. Corbet, R. Hartland-Rowe and A. Tjønneleand, chiefly in Uganda. Most of the material including the types of new species, has been presented to the British Museum (Nat. Hist.), for which the author wishes to express his thanks to the respective donors. Notes are given on various species of *Cloëon*, *Procloëon*, *Centroptilum* and *Adenophlebiodes*, two new species are described and one homonym is re-named. Publication of notes on species of the family Caenidae has been postponed pending the completion of revisionary work being undertaken by Mr. Thomas B. Thew, of East Moline, Illinois.

Family OLIGONEURIIDAE

Elassoneuria candida Eaton

(Text-fig. 1)

UGANDA: Victoria Nile, Karuma Falls, 1959 (*P. S. Corbet*).

This species has been synonymized with *trimeniana* (McLachlan) by Ulmer (1916, *Ark. Naturg.* 81A (7) : 4), but examination of the ventral plates of the female types of the two species has shown that in *trimeniana* the lateral processes of the ninth segment are about twice as long as the ventral plate, whereas in *candida* they are only about as long as the ventral plate. In the present series there is some variation in the relative length of the lateral processes of the ninth segment, which may be clearly longer than the ventral plate but not as much as twice as long. It is possible that examination of a series of females of *Elassoneuria* from Natal may show variation overlapping that of the Uganda examples, but for the time being it seems desirable to keep *trimeniana* distinct from the Equatorial species *candida*. Ulmer's 1916 description of *trimeniana* was based mainly upon Equatorial specimens and the Uganda examples conform reasonably to this description.

In 1916 Ulmer makes no mention of the ♂ genitalia, but in 1920 (*Stett. ent. Ztg.* 81 : 128) in his key to the genera of the Oligoneuriidae, he describes the forceps as being three-segmented, the basal segment very long, the two apical segments very small. In the Uganda examples there is a microscopic *fourth* segment; whether Ulmer's examples were really only three-segmented or whether this minute fourth

segment had been detached or over-looked, one cannot say. Its occurrence in the Uganda examples removes one of the characters separating *Elassoneuria* from *Oligoneuriopsis*, but the wing-venation of the Uganda material is definitely that of *Elassoneuria*, as figured by Barnard.

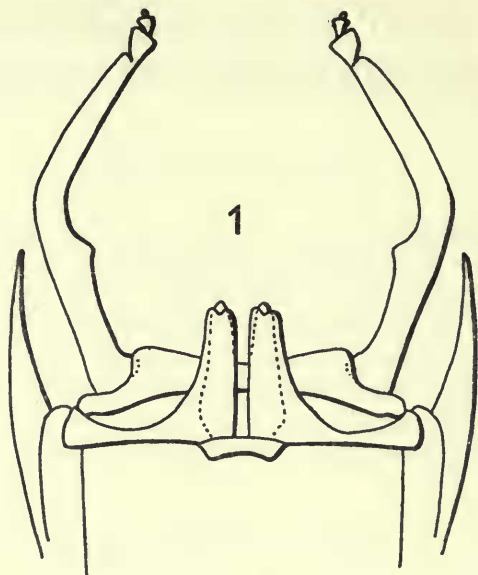


FIG. 1. *Elassoneuria candida* Eaton. ♂ Genitalia, dorsal.

Elassoneuria trimeniana (McLachlan)

Zambezi (Chipepo's), 20.iv.1956 (*G. Fryer*).

A single female is referred with some doubt to this species, chiefly on the grounds that the lateral processes of the ninth segment are much longer than in the type of *candida*. The acute points bordering the excision of the ventral plate are asymmetric, one being longer than the other.

Family HEPTAGENIIDAE

Afronurus ugandanus Kimmins

TANGANYIKA : L. Victoria, Mwanza Pier, 11-13.viii.1956 (*P. S. Corbet*).

Family BAËTIDAE

Cloëon dentatum Kimmins

UGANDA : Jinja, at light, iii.1956 (*P. S. Corbet*).

Some examples sent by Dr. A. Tjønneland from Jinja differ slightly from the figure of the paratype in the blunter outline of the arched plate above the forceps-

base. The difference is probably due to the figure having been drawn from a cleared example ; it is certainly insufficient to be considered a specific character.

DISTRIBUTION. Uganda.

Cloëon scitulum Kimmins

UGANDA : Jinja, 4, 24.v.1956 ; Entebbe, 31.xii.1955 ; Albert Nile, Pakwach, 26.iv.1956 (*P. S. Corbet*).

KENYA : L. Victoria, Kavirondo Gulf, Kisumu, 1956 (*P. S. Corbet*).

DISTRIBUTION. Nyasaland, Uganda, Kenya.

Cloëon perkinsi Barnard

(Text-fig. 6)

UGANDA : Jinja, vi.1956 ; Kampala, 6.iv.1956 ; Entebbe, 1956 ; Albert Nile, Pakwach, 26-29.iv.1956 (*P. S. Corbet*).

TANGANYIKA : L. Tanganyika, Kigoma, 16-20.viii.1956 ; L. Victoria, Mwanza Pier, 11-13.viii.1956 (*P. S. Corbet*).

These East African examples, which I believe to be Barnard's species, show considerable variation in the pattern of the abdomen. In a female imago from Jinja, the pattern agrees quite well with that described and figured by Barnard, but others show a progressive reduction of the red pigmented pattern until it is much reduced. In subimagines the narrow lateral line is often absent. I have seen few male imagines but in the subimagines the red pigment is usually much less pronounced.

In the male imago (alcohol), the turbinate eyes are honey-yellow. Head deep cream-coloured, ocelli ringed with reddish brown, two basal segments of antenna marked with reddish at apices. Thorax pale shining brown, legs creamy white. Wings hyaline with pale veins, except at extreme base of wing, where they are pale fuscous. Dorsum of abdomen reddish brown, with two narrow, sinuous, yellow lines enclosing a spot of reddish brown (or forming pale divergent lines, or dark spots absent) on segments two to seven, and with a pale yellowish lateral line. Sternites yellowish. Forceps whitish.

DISTRIBUTION. S. Africa, Uganda, Tanganyika, ? Gold Coast.

Procloëon areolatum (Navás)

UGANDA : Kampala, Makerere, 16.v.1955, viviparous ♀ (*R. Hartland-Rowe*) ; Entebbe, 17-18.vi.1958 (*P. S. Corbet*).

PREVIOUS DISTRIBUTION. Congo.

Procloëon cylindroculum Kimmins

(Text-fig. 6)

UGANDA : Entebbe, 31.xii.1955, 17-18.vi.1958 (*P. S. Corbet*) ; Jinja, 4.iii.1954 ; Kaazi, 16.ii.1954 (*R. Hartland-Rowe*).

A fairly long series taken at light at Entebbe by Dr. Corbet enables me to give descriptions of the female imago and of the male and female subimagines. First, however, it is necessary to correct a statement in the original description of the male abdomen. Lines 3 and 4 from foot of p. 865 should read "Abdomen with basal tergite fuscous, apex translucent whitish."

♀ Imago (in alcohol). Head whitish, eyes greyish black, posterior ocelli encircled with black. Antenna white, basal segment marked with black apically on both sides, second segment white, terminal bristle fuscous. Pronotum white, with two reddish purple, lateral lines, the upper shorter than the lower, which traverses the entire thorax as a narrow lateral line to link up with the abdominal lateral line. Pterothorax whitish, faintly yellowish brown above. Legs whitish. Wings hyaline, with pale fuscous veins, venation as in male. Abdomen whitish, with an interrupted, reddish purple, lateral line, much as in the figure of the female subimago. Cerci white, banded at intervals with deep reddish purple.

Length of fore wing, 5 mm.

♀ Allotype (in 2% formaldehyde solution) in British Museum (Nat. Hist.).

♂ Subimago (in alcohol). Head creamy white, turbinate eyes cylindrical, pale orange-brown, posterior ocelli bordered on inner margins with purplish black, antenna whitish. Pronotum whitish, with faint fuscous markings. Pterothorax pale brownish above, with large creamy white areas. Legs whitish. Wings whitish hyaline, with white veins. Abdomen whitish, in strongly marked specimens with a pair of reddish brown spots near apical margin of fourth tergite. A pair of larger transverse spots near apical margin of seventh tergite and the greater part of the eighth and ninth tergites reddish, which colour may also extend on to the tenth tergite. The extreme apical margin of tergites two to seven are finely reddish and there may be traces of faint fuscous lateral lines on the same segments. Sternites are whitish as are the forceps. Cerci white, sometimes faintly annulated at intervals with purplish. The intensity of colour of the tergites varies considerably in individuals, possibly due to age.

♀ Subimago. Ground colour whitish, marked with reddish much as in the imago.

DISTRIBUTION. Nyasaland, Uganda, Tanganyika.

Procloëon rhodesiae (Barnard)

(Text-figs. 2, 6)

UGANDA: Kampala, Port Bell, 6-7.iv.1956; Jinja, at light, 4.v.1956, 15.vi.1956, 2.viii.1956; Mbanga Forest, near Mpigi, 1958; Entebbe, 17-18.vi.1958 (*P. S. Corbet*).

KENYA: L. Victoria, Kavirondo Gulf, Kisumu, 1956 (*P. S. Corbet*).

TANGANYIKA: R. Malagarazi, Katara, 27.viii.1954 (*R. H. Lowe*).

Demoulin has retained *rhodesiae* in *Cloëon* because the material before him was lacking in posterior tarsi and Barnard gives no details as to the relative proportions of the tarsal segments of the posterior legs. I have not examined Barnard's type specimens, but there are in the British Museum three females from Salisbury (one

of the type localities), collected in 1900 by G. A. K. Marshall. Though a little faded, these agree well in the pattern of the costal margin of the wing; the medio-dorsal raw sienna stripe on the abdomen is present but the "triangular castaneous patch in postero-lateral corner of segments 3-6 dorsally" is present in segments three and six only. It is possible that the species may vary in this respect or that the description may be inaccurate. In any case, I do not consider that the difference between the description and the British Museum examples to be of specific importance. The important fact is that our examples have the basal¹ segment of the posterior tarsus about three times as long as the following segment and the species should therefore be transferred to the genus *Procloëon*.

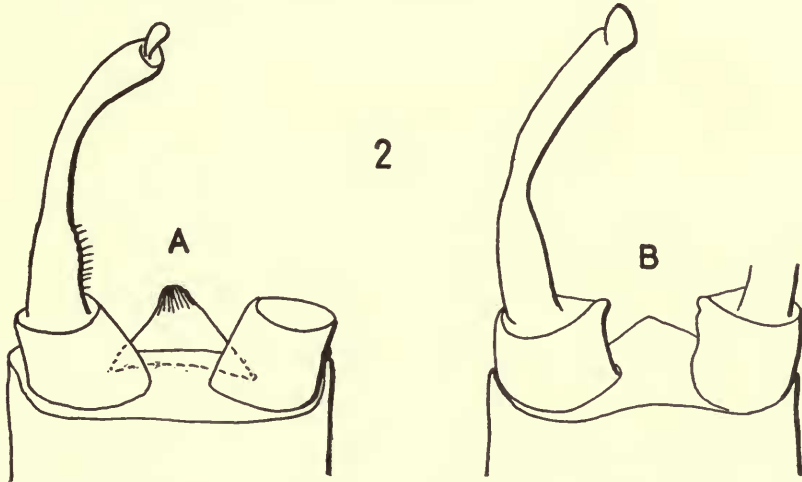


FIG. 2. ♂ Genitalia, ventral, of (A) *Procloëon rhodesiae* (Barnard) and (B) *Pseudocloëon camerunense* Ulmer.

The British Museum also has a female with similarly marked wings from Uganda, Kampala. This example has the triangular, reddish castaneous patches on segments three and six, but the median dorsal stripe is represented only by reddish transverse lines at the apices of each segment. Dr. Corbet's collection contains three females in alcohol, also from Kampala. In these, the pterostigmatic pattern is stronger than in the pinned examples and the triangular patches on segments three and six are reddish but less distinct. I am prepared, however, to accept these examples as being within the range of variation of *Procloëon rhodesiae*. To Barnard's description of the female can be added that there is a pre-apical reddish ring on each femur, and that there is a small reddish spot in the centre of the basal margin of the sixth to ninth segments.

♂ Imago (in alcohol). Head creamy white, turbinate eyes dilating dorsally, pale orange-yellow. Basal segment of antenna with a small black spot externally at apex. Posterior ocelli with inner margins blackish. Thorax pale brownish above,

¹ Strictly speaking, this should be termed the second segment, since the first is fused with the tibia.

with darker markings. Legs whitish, femora with faint reddish pre-apical rings. Wings hyaline, veins very pale, a small black spot on humeral cross-vein. Abdominal segments one to seven translucent whitish, lateral trachea marked with a fine blackish line. Towards apex of each tergite there is a narrow, transverse, reddish line and in the postero-lateral angle of segments three and six is a reddish brown, triangular patch. Segments eight and nine opaque whitish, tinged with bright reddish. Sternites five to eight with a small reddish spot at centre of apical margin. Forceps whitish. Cerci whitish, with a few deep reddish purple annulations.

In the preserved subimagines the main abdominal pattern can be seen, but there is little or no trace of the pterostigmatic markings of the female.

P. rhodesiae seems to be closely related to *P. areolatum* (Navás), judging by the figure of the female wing given by Demoulin. The pterostigmatic marking is slightly more extensive and differs in detail and the basal costal cross-veins are stronger in *areolatum*.

Procloëon smaeleni (Lestage)

UGANDA: Kampala, Makerere, 7, 30.v.1955 (*R. Hartland-Rowe*).

DISTRIBUTION. Congo, Ghana (Gold Coast), Sierra Leone, Uganda.

Pseudocloëon camerunense (Ulmer)

(Text-figs. 2, 3)

UGANDA: Jinja, 17, 22.v., 2.viii., 17.ix.1956; Entebbe, 1956 (*P. S. Corbet*).

These specimens do not agree exactly in the structure of the male genitalia as figured by Ulmer. He shows a much more definite point on the inner angle of the

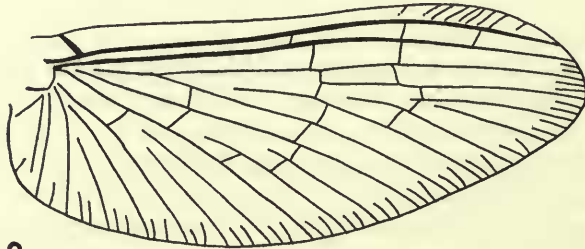


FIG. 3. Wing of *Pseudocloëon camerunense* Ulmer.

forceps-base and the triangular plate appears to come in front of, instead of behind, the forceps-base. I consider that these are merely differences in interpretation and not of specific value. There are also slight differences in the abdominal pattern and the Uganda examples are rather larger.

PREVIOUS DISTRIBUTION. Cameroons.

Baëtis ? bellus Barnard

UGANDA : Entebbe, 1956 ; Jinja, ix-x. 1954 (*P. S. Corbet*).

These two specimens are referred here with some doubt. The abdominal pattern of the male is faded and obscure but the terminal segment of the forceps is small. The hind wing has no costal process. This genus is noted for the difficulty of identifying examples specifically and it seems more likely that its taxonomic difficulties will be solved by a study of the larvae than by multiplying descriptions based upon faded museum material.

DISTRIBUTION. S. Africa.

Centroptilum montanum sp. n.

(Text-figs. 4-5)

UGANDA : Mt. Elgon, 11,600 ft., R. Sasa, 29. xii. 1954, 11 ♂ (*P. S. Corbet*).

♂ Imago (in alcohol). Head fuscous. Turbinate eyes (somewhat telescoped) brownish orange, with a definite fuscous margin, lower eyes grey. Antenna fuscous. Thorax chestnut-brown above, paler on sides. Legs medium or pale fuscous. Wings hyaline, slightly fumose, with brownish veins. Pterostigma with seven to ten cross-veins. Hind wing with three longitudinal veins, costal process bifid, arising from a broad base, basal process slender, hooked, apical process much as in *dicentrum* Demoulin. Abdominal segments two to seven pale translucent brownish, tergites two to six or seven with a distinct purplish transverse band at apical margin, remaining tergites very narrowly margined with the same colour. Sternites with similar but paler bands. Cerci and forceps pale fuscous. Forceps-base deeply divided, inner angles of each half produced in angular tooth-like callosities. Basal and second segments fused, terminal segment about one-third as long as one and two together, sausage-shaped.

Length of fore wing, 7 mm.

♂ Holotype mounted as microscope preparations, paratypes in 2% formaldehyde solution, British Museum (Nat. Hist.). In general appearance this species appears to be similar to *C. dicentrum* Demoulin (Kivu, Mt. Muhi), but is rather smaller. There are fewer pterostigmatic cross-veins, the hind wing is a little broader and the basal costal process more slender. The forceps appear to differ considerably, especially in the shape of the forceps-base. The forceps of *dicentrum* are figured as much closer together than in *montanum*, and suggest that the centre of the forceps-base may have collapsed. *C. dicentrum* also appears to have the basal and second segments less completely fused.

Centroptilum loweae Kimmins

(Text-figs. 4, 6)

UGANDA : Entebbe, 1956 : Jinja, 14. v. 1956 (*P. S. Corbet*) ; Kaazi, 11. viii. 1954 (*R. Hartland-Rowe*).

TANGANYIKA : L. Victoria, Bukoba, 10. viii. 1956 (*P. S. Corbet*).

The original specimens of *C. loweae* were considerably bleached and I am therefore giving descriptions from more recent material.

♂ Imago (in alcohol). Head medium fuscous, with two narrow cream stripes on upper surface between posterior ocelli. Antenna pale fuscous, apical half of terminal style whitish. Turbinate eyes large, obscuring lower eyes from above,

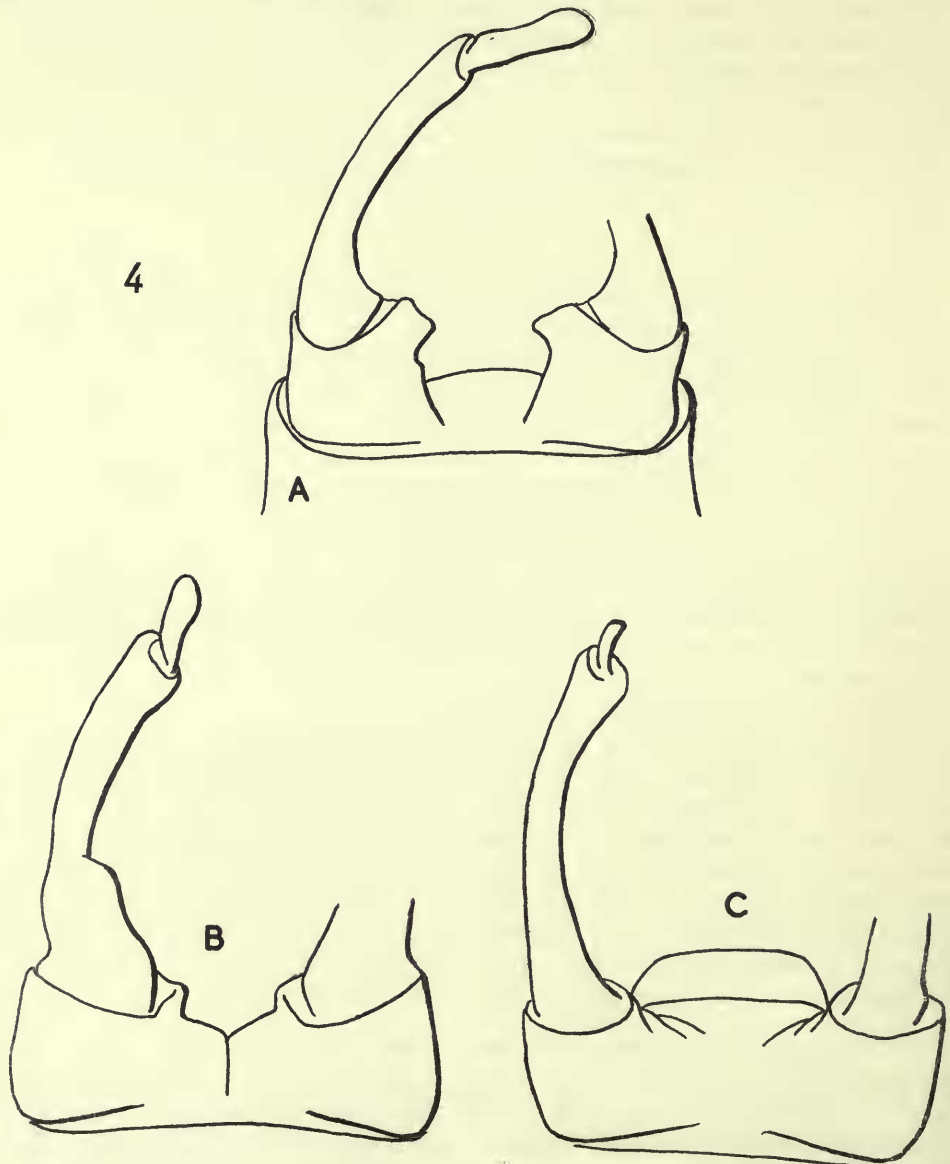


FIG. 4. ♂ Genitalia, ventral, of (A) *Centroptilum montanum* sp. n., (B) *C. loweae* Kimmins and (C) *C. falcatum* Crass, paratype.

dull orange, margin finely bordered with fuscous. Lower eyes blackish. Pronotum fuscous. Meso- and metathorax shining brown, with scattered whitish areas, more especially on the sides. Legs whitish, anterior femur pale fuscous. Wings hyaline, with whitish veins, base of fore wing pale fuscous. Fore wing with four to six complete costal cross-veins in pterostigma, no costal cross-veins before the bulla. Hind wing long and narrow, with two longitudinal veins, costal process slender and hooked.

Abdomen whitish, slightly fuscous, segments two to six translucent, seven to ten opaque, slightly more fuscous. Segments one to seven each with a fine black lateral line on each side, about half the length of the segment. Some specimens show a varying amount of pinkish suffusion. Forceps greyish white. Cerci whitish. Terminal segment of forceps variable in length, often rather more elongate than in the type.

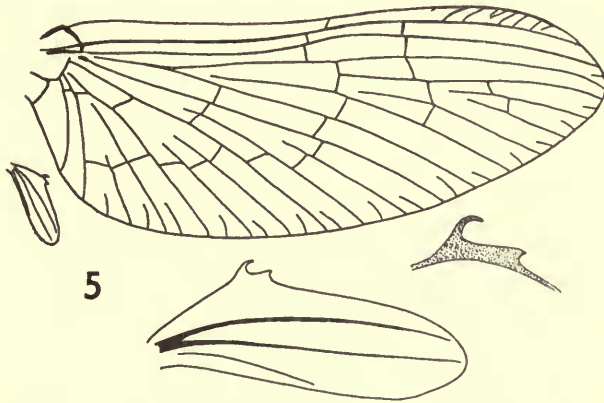


FIG. 5. ♂ Wings of *Centroptilum montanum* sp. n.

♂ Subimago (in alcohol). Head creamy white, with sometimes a pinkish flush above. Turbinate eyes pale orange, not quite as large as in adult. Pronotum creamy white, with a short, pinkish, transverse bar anteriorly and traces of other pinkish markings. Thorax creamy white with some fuscous markings on the sutures. Legs whitish, femora (particularly anterior) faintly fuscous. Wings whitish, with a small fuscous streak at base of radius. Abdomen with a creamy white ground, in unfaded specimens with a pinkish pigmented pattern as in Text-fig. 6. Cerci and forceps whitish.

♀ Subimago. Pattern generally less obvious than in ♂ subimago.

In general the Lake Victoria examples are rather smaller than those from L. Nyasa. The abdominal pattern, particularly in the subimagines, is rather fugitive and tends to bleach out in alcohol or formalin solutions. The ground colour, described as whitish or cream, may well be some other colour in life, but which has been completely dissolved or destroyed in alcohol. In the absence of colour notes made at the time of collecting, there is no way of telling. *C. sudafricanum* Lestage (det. Barnard) also has the fuscous margins to the turbinate eyes in the male, but may be

distinguished by the bifid costal process to the hind wing and by the larger terminal segment of the forceps.

DISTRIBUTION. Nyasaland, Tanganyika, Uganda.

Centroptilum falcatum Crass

UGANDA : Kampala, Port Bell, 6-7.iv.1956 ; Entebbe, 31.xii.1955 ; Jinja, v, viii-ix.1954 ; W. Nile, near Laropi, 27-28.iv.1956 (*P. S. Corbet*) ; Kaazi, 16-17.ii.1954 (*R. Hartland-Rowe*).

TANGANYIKA : L. Victoria, Mwanza Pier, 11-13.viii.1956 (*P. S. Corbet*).

KENYA : L. Victoria, Kavirondo Gulf, Kisumu, 1956 (*P. S. Corbet*).

The rather elongate-oval turbinate eyes of the male, with longitudinal axes diverging forwards, appear to be a useful recognition character, as is the very small terminal segment of the forceps.

The preserved examples of what I believe to be *C. falcatum* Crass show considerable variation in the degree and type of abdominal pattern. In a paratype of this species there is now no trace of the pattern described by Crass and I have therefore been influenced in my interpretation by the structure of the male anal appendages and the shape of the turbinate eyes. The abdominal pattern of the male imagines and subimagines varies from almost unicolorous whitish, through a form with narrow, reddish, apical, transverse lines, to forms with a more or less evident reddish mark on the sixth tergite and finally to forms with a definite median dorsal line. The females show a somewhat similar variation. In my preliminary sorting of this material I provisionally separated them into three possible species, but subsequent study showed no constant differences in the male genitalia and intergrading in colour pattern, so that I do not feel justified in considering them as more than one species. I am giving diagrammatic figures of the abdominal patterns of several of the forms, in the hope that further study in the field may produce evidence to confirm or refute my interpretation.

DISTRIBUTION. S. Africa, Uganda, Tanganyika, Kenya.

Centroptilum medium Crass

(Text-fig. 6)

UGANDA : Jinja, xii.1954, 14, 24.v., 22.vii.1956 ; Entebbe, 1956 ; West Nile, Pakwach, 26, 29.iv.1956 (*P. S. Corbet*).

This species also has elongate-oval eyes, diverging anteriorly but may be distinguished from *falcatum* by the more elongate apical segment of the forceps and by the broader hind wing, with a blunter costal process. These specimens differ slightly in abdominal pattern from Crass' description but the differences are no more than might be expected in normal variation.

DISTRIBUTION. S. Africa, Uganda.

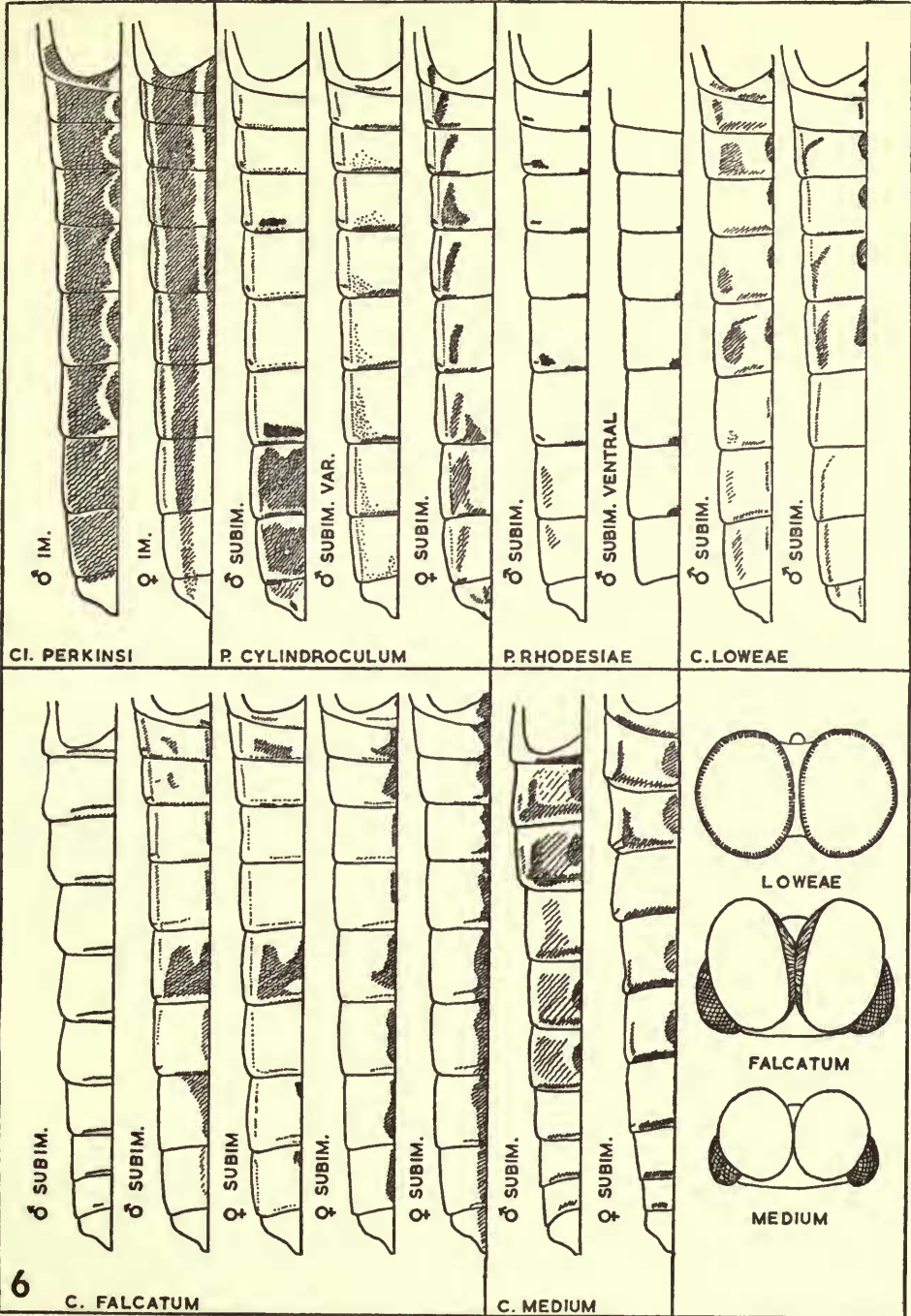


FIG. 6. Diagrammatic drawings of abdominal colour pattern of *Cloëon*, *Procloëon* and *Centroptilum* spp. (dorsal unless otherwise stated) and eyes of *Centroptilum* spp. ♂ from above.

Centroptilum sudanense Ulmer

UGANDA: Jinja, v. 1956; Victoria Nile, L. Kyanga, 1956; Entebbe, 1956 (*P. S. Corbet*).

DISTRIBUTION. Sudan, Uganda.

Centroptilum flavum Crass

UGANDA: Jinja, 15-24. vii., 19. ix. 1956 (*P. S. Corbet*).

DISTRIBUTION. S. Africa, Uganda.

Centroptilum notabile Kimmins

UGANDA: Jinja, various dates, 1956 (*P. S. Corbet*).

TANGANYIKA: L. Victoria, Mwanza Pier, 11-13. viii. 1956 (*P. S. Corbet*).

DISTRIBUTION. Uganda, Tanganyika.

Family LEPTOPHLEBIIDAE

Adenophlebia burgeoni Navás

(Text-fig. 7)

UGANDA: Mbanga Forest, near Mpigi, 1958, at M/V light (*P. S. Corbet*).

The type of this species is a ♂ subimago and I therefore take this opportunity of figuring the male genitalia from Corbet's examples. The forceps are rather more slender than in the *dislocans* group, and are more gradually tapered. The ventral hooks of the penis-lobes are less outwardly directed. In the hind wing the apical margin beyond the costal hump is straight, not concave as in the *dislocans* group.

Adenophlebiodes (A.) ornatus (Ulmer)

(Text-fig. 8)

Adenophlebia ornata Ulmer, 1916, *Arch. Natges.* 81 A (7): 13, figs. 12-14.

Adenophlebiodes ornatus Ulmer, 1924, *Konowia*, 3: 34.

?*Habrophlebia delamarei* Verrier, 1951, *Bull. Soc. ent. Fr.* 56: 45-46, fig. 1, ♂ only. (*Syn. nov.*).

UGANDA: Mbanga Forest, near Mpigi, 1958, at M/V light (*P. S. Corbet*).

Corbet's specimens differ slightly from Ulmer's description and figure in the paler and less extensive abdominal markings, more resembling the figure of Verrier's *delamarei*. They differ from both Ulmer's and Verrier's descriptions in having the femora banded with purplish black about mid-way. I do not consider these differences to be of specific importance and it seems likely that Verrier's species is a synonym of *A. ornatus* (Ulmer). The female ascribed by Verrier to *delamarei* is said to have the basal half of the fore wing and the posterior wing almost uniformly tinted with brownish. I have seen similar examples from West Africa which I believe to be

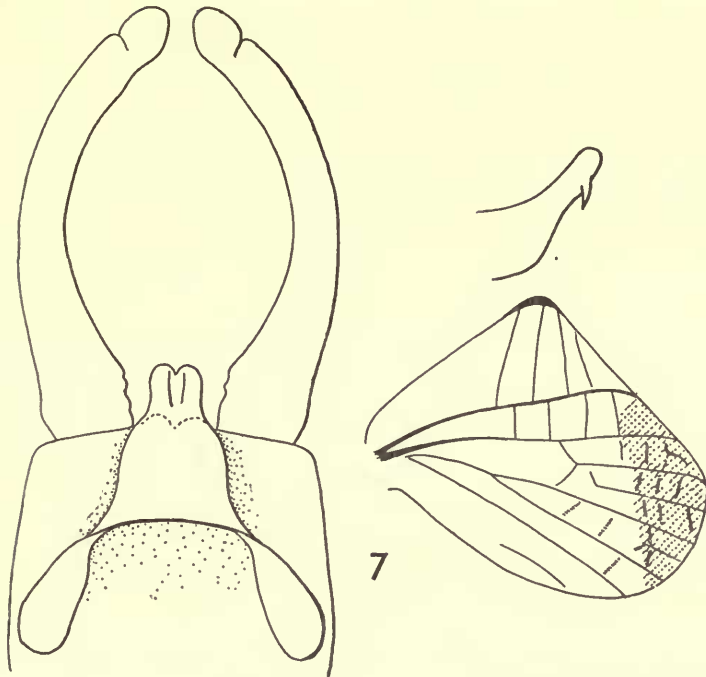
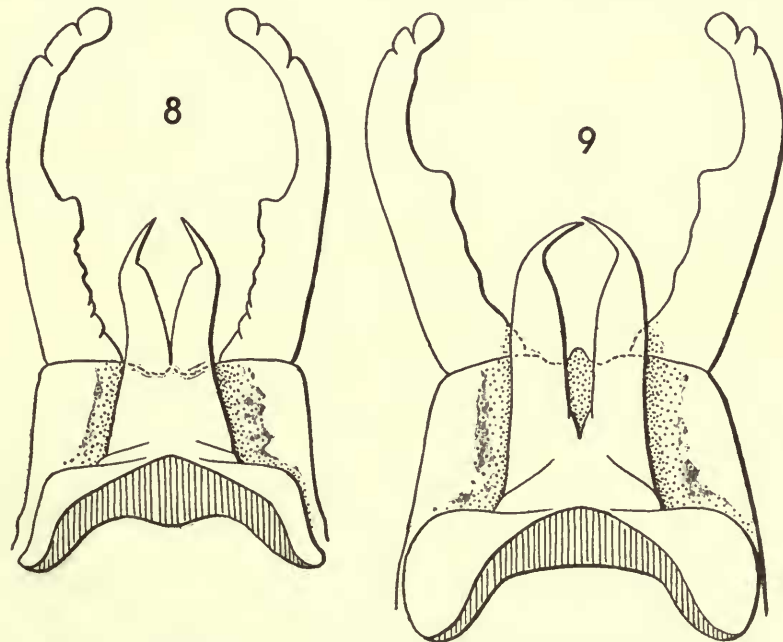


FIG. 7. *Adenophlebia burgeoni* (Navás). ♂ Genitalia, dorsal, apex of penis-lobes, lateral and ♂ hind wing.



FIGS. 8-9. (8) *Adenophlebiodes ornatus* (Ulmer), ♂ genitalia, dorsal; (9) *A. demoulini* nom. nov., ♂ genitalia, dorsal.

A. bicolor (Crass) and I suspect that Verrier's female will also prove to be that species. A new figure of the male genitalia is given.

DISTRIBUTION. Cameroon, Uganda, ? Ivory Coast.

***Adenophlebiodes (Hyalophlebia) demoulini* nom. nov.**

(Text-fig. 9)

Adenophlebiodes decoratus Kimmins, 1956 (*nec* Navás, 1931), *Bull. Brit. Mus. (Nat. Hist.)*, *Ent.* 4: 77.

Dr. G. Demoulin drew my attention some time ago to his paper (1955, *Bull. Ann. Soc. R. Ent. Belg.* 91: 281-290) in which he erects the subgenus *Hyalophlebia* for the hyaline-winged species of *Adenophlebiodes* and also transfers *Adenophlebia decorata* Navás, 1931 to the genus *Adenophlebiodes*. My species was therefore a homonym of *A. decoratus* (Navás) at its publication and I have pleasure in renaming it after Dr. Demoulin. A new figure of the male genitalia is given, for comparison with that of *A. (A.) ornatus* (Ulmer).

***Hagenulus fasciatus* Kimmins**

UGANDA: Jinja, 1956 (*P. S. Corbet*); Jinja (*A. Tjönneland*).

TANGANYIKA: L. Victoria, Mwanza Pier, 11-13.viii.1956 (*P. S. Corbet*).

♀ Imago (in alcohol). Head dull fuscous, antennae whitish, eyes blackish. Pronotum medium fuscous, margins darker. Thorax warm brown. Legs whitish, knees fuscous, brown extending about half-way down tibiae. Abdomen pale purplish brown above, pale fuscous below. Seventh sternite fuscous in its apical third, with a whitish area in the centre of the margin, simulating an excision. Ninth sternite produced in a fuscous, parabolic ventral plate with a narrow, truncate apex. Cerci greyish, with darker basal annulations. Wings as in male.

Length of fore wing, 9 mm.

♀ Allotype (in 2% formaldehyde solution) in British Museum (Nat. Hist.), collected and presented by Dr. A. Tjönneland.

***Euthraulius bugandensis* Kimmins**

UGANDA: Jinja, various dates, 1956 (*P. S. Corbet*, *A. Tjönneland*).

♂ Subimago. Eyes coloured as in imago. Prothorax purplish grey on a cream ground. Meso- and metathorax warm brown, with cream sutures. Wings pale grey. Legs whitish, femora each with purplish median and subapical bands, tibiae with a purplish spot on knees. Abdomen purplish grey above, bases of tergites and intersegmental membranes whitish. Ventrally creamy white. Cerci and appendages whitish.

Dr. Tjönneland informs me that the subimagines of *E. bugandensis* and *E. curtus* are easily separable in the field by the colour of the wings. In *E. bugandensis* they are "slate" grey and in *E. curtus* "very pale grey".

Euthraulius curtus Kimmins

TANGANYIKA : L. Victoria, Mwanza Pier, 11-13.viii.1956 (*P. S. Corbet*).
DISTRIBUTION. Uganda, Tanganyika.

Family TRICORYTHIDAE

Tricorythus tinctus Kimmins

UGANDA : Owen Falls Dam, 27.i.1956 ; Kagera River, Kuwanda, 19.iv.1955 (*P. S. Corbet*).

KENYA : Nzoia River, Lwamba Ferry, 19-20.iv.1956 (*P. S. Corbet*).

DISTRIBUTION. Uganda, Kenya.

Tricorythus maculatus Kimmins

The ♂ type of this species was somewhat defective and rather faded and additional material from Nyasaland and Uganda makes it possible to fill in some of the gaps in the original description.

Fore leg with trochanter pale fuscous, femur whitish with fuscous apex, tibia whitish, fuscous at base and apex, tarsus whitish, faintly shaded with fuscous. Median leg whitish, femur with a dorsal, pre-apical, fuscous spot. In more strongly marked specimens, abdominal segments five to seven have a fine blackish lateral line, that on seven curving round on to apical margin, almost reaching the "pair of small apical spots". The "small basal triangles" on eight and nine may extend as a pair of parallel blackish lines.

DISTRIBUTION. Nyasaland, Uganda.

Tricorythus longus Ulmer

UGANDA : Victoria Nile, L. Kyoga (*P. S. Corbet*).

DISTRIBUTION. Belgian Congo, Uganda.

Tricorythus lanceolatus sp. n.

(Text-fig. 10)

UGANDA : West Nile, near Laropi, 27-28.iv.1956, numerous ♂, ♀ (*P. S. Corbet*).

♂ Holotype (in alcohol). Head creamy white, eyes black, likewise the bases of the ocelli. Two faint greyish crescentic marks on vertex and a blackish streak from each eye on back of head. Antennae very pale greyish. Pronotum with anterior half pale grey with obscure cream markings, posterior half with two large creamy spots, separated by a narrow greyish median line, lateral margins broadly, and basal margin narrowly grey. Meso- and metanota creamy yellow, anterior angles of mesothorax greyish. Thoracic pleurae faintly greyish, venter yellowish. Legs pale creamy white, femora with narrow dorsal grey line. Wings hyaline, costal and sub-

costal areas purplish grey in basal two-thirds, other veins whitish. Abdomen creamy white, each tergite with a greyish lateral streak and with traces of a pair of median longitudinal grey streaks. The latter become more distinct on the apical segments. Cerci whitish, with purplish black annulations. Sternites creamy, with traces of greyish lateral streaks.

♂ GENITALIA creamy white. Forceps-base produced apically in a rounded lobe, the lobe being nearly as long as the main part of the forceps-base. Forceps two-segmented, basal segment short, cylindrical, rather more than twice as long as wide. Terminal segment rather more than one and a half times as long as basal, stout at its base, then tapering to a curved finger about half as wide as basal segment, apex curved inward. Inner surface rugose. Penis-lobes flattened dorso-ventrally, fused

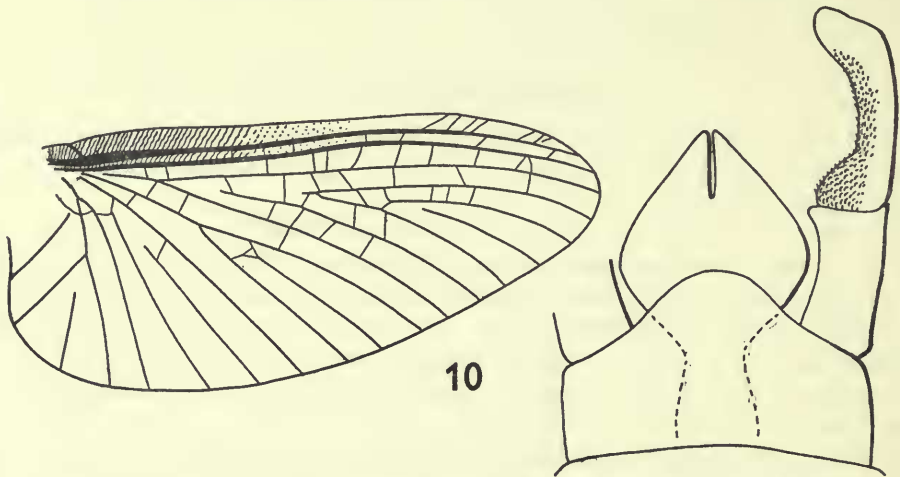


FIG. 10. *Tricorythus lanceolatus* sp. n. ♂ Wing and genitalia, ventral.

except for apical fourth, narrow in basal third, then dilated and broadly lanceolate, with a narrow apical excision.

♀ Allotype (in alcohol). Head with more extensive markings than in male. Pronotum greyish, with two pale creamy spots in basal half, smaller than in male and separated by a greyish band rather broader than the pale spot. Meso- and meta-thorax yellowish, thickly dusted with greyish dots, venter pale, almost unmarked. Femora with longitudinal bands of dark grey. Wings hyaline, anterior margin purplish grey in basal two-thirds. Abdominal tergites heavily dusted with greyish, with a narrow cream median stripe, and with the lateral margins of tergites one to seven narrowly cream. Ventrally almost immaculate. Cerci short, whitish. Ventral plate parabolically produced.

Length of fore wing, ♂, 4-4.4 mm., ♀, 5-5.6 mm.

♂ Holotype and ♀ allotype now mounted whole as microscope slides in euparal, 1 paratype ♂ dissected and mounted as microscope preparations, remaining paratypes in 2% formaldehyde solution. This species is closely related to *T. latus* Ulmer,

and I at first assumed that it was that species. Comparison of preparations with Demoulin's figure of the male genitalia of *T. latus* (from a preparation of a syntype) revealed certain differences in genitalia, which appear to be constant in the material under review. The most noticeable is the form of the terminal segment of the forceps, which is relatively shorter and stouter in *T. latus* and much more hooked inwards. The lobes of the penis are more distinctly rhomboidal in shape than in *T. latus*. Demoulin's figure does not show the stem of the penis-lobes, but he shows the lateral margins tapering much more gradually towards the base than in the present species. Ulmer gives as type localities for *T. latus*, Leopoldville and Kinchassa (on the R. Congo) and Bahr el Djebel, source of the Nile. Demoulin's figures are from Congo syntypes and I would suggest that one of the Congo specimens in the Institut royal des Sciences naturelles de Belgique be designated by Dr. Demoulin as lectotype of *T. latus* Ulmer. In view of the difference between *T. lanceolatus* from the West Nile and *T. latus* from the River Congo, it seems possible that the Bahr el Djebel specimens may not be conspecific with those from the Congo.

Family EUTHYPLOCIDAE

Exeuthyplocia minima (Ulmer)

UGANDA : Victoria Nile, Karuma Falls, 1959 (*P. S. Corbet*).
Previously recorded from Congo and Togoland.

Family EPHEMERIDAE

Afromera aequatorialis (Kimmins)

UGANDA : Entebbe, 1956 ; Masaka, Busungwe Bay, 21.iv.1956 (*P. S. Corbet*).

